

CLAIM SUMMARY DOCUMENT

Claims 1-24 (Canceled).

25. (Previously Amended) A gas injector for supplying process gas to a plasma processing chamber wherein a semiconductor substrate is subjected to plasma processing, the gas injector comprising:

gas injector body sized to extend through a chamber wall of the processing chamber such that an axial distal end surface of the gas injector body is exposed within the processing chamber, the gas injector body including a plurality of gas outlets adapted to supply process gas into the processing chamber, the gas outlets including a center gas outlet extending in the axial direction and a plurality of angled gas outlets extending at an acute angle to the axial direction, wherein the gas outlets are located in the axial distal end surface of the gas injector body.

Claims 26-27 (Canceled).

28. (Previously Added) The gas injector of Claim 25, wherein the gas outlets are sized to inject the process gas at a subsonic, sonic, or supersonic velocity.

29. (Previously Added) The gas injector of Claim 25, wherein the gas injector includes a planar axial end face which is dimensioned so as to be flush with an interior surface of a dielectric window forming the chamber wall.

30. (Previously Added) The gas injector of Claim 29, wherein the gas injector includes at least one seal adapted to contact the dielectric window when the gas injector is mounted in the dielectric window.

31. (Previously Added) The gas injector of Claim 25, wherein the gas injector includes a closed distal end surface and the gas outlets inject process gas at an acute angle relative to a plane parallel to the distal end surface.

32. (Previously Added) The gas injector of Claim 25, wherein the gas injector is adapted to be removably mounted in an opening in the chamber wall and includes at least one O-ring providing a vacuum seal between the gas injector and the chamber wall.

E1
cut
33. (Previously Added) The gas injector of Claim 25, wherein the gas injector body includes a surface adapted to overlie an outer surface of the chamber wall.

34. (Previously Added) The gas injector of Claim 25, wherein the gas injector body includes an annular flange adapted to overlie and contact an outer surface of the chamber wall.

35. (Previously Added) The gas injector of Claim 25, wherein the gas injector body includes at least one O-ring seal on an outer surface of the gas injector body.

36. (Previously Added) The gas injector of Claim 25, wherein the gas injector body includes a first O-ring seal on an outer surface of the gas injector body and a second O-ring seal in a surface of a flange extending from the outer surface of the gas injector body.

37. (Previously Added) The gas injector of Claim 25, wherein the distal end of the gas injector body is substantially planar.

38. (Previously Added) The gas injector of Claim 25, wherein all of the gas outlets supply process gas through the distal end of the gas injector body.

El
Cmt
39. (Previously Amended) A gas injector for supplying process gas to a plasma processing chamber wherein a semiconductor substrate is subjected to plasma processing, the gas injector comprising:

gas injector body sized to extend through a chamber wall of the processing chamber such that an axial distal end surface of the gas injector body is exposed within the processing chamber, the gas injector body including a plurality of gas outlets adapted to supply process gas into the processing chamber, the gas outlets including a center gas outlet extending in the axial direction and a plurality of angled gas outlets extending at an acute angle to the axial direction, wherein the gas outlets are located in the axial distal end surface of the gas injector body;

an annular flange adapted to overlie and contact an outer surface of the chamber wall; and

a first O-ring in a surface of the flange for sealing against the outer surface of the chamber wall.

40 (Previously Added) The gas injector of Claim 39, comprising a second O-ring seal on an outer surface of the gas injector body.

41. (Currently Added) The gas injector of Claim 25, wherein the gas injector body includes a uniform diameter central bore extending axially from an upper axial end face of the gas injector body, the central bore being defined by a cylindrical sidewall and a flat endwall, inlets of the gas outlets being located on the flat endwall.

42. (Currently Added) The gas injector of Claim 25, wherein the gas injector body is made of dielectric material.

43. (Currently Added) The gas injector of Claim 25, wherein the gas injector body includes 8 of the angled gas outlets.

44. (Currently Added) The gas injector of Claim 25, wherein the acute angle is 10 to 70°.

45. (Currently Added) The gas injector of Claim 25, wherein the angled gas outlets direct the process gas such that the process gas does not flow directly towards a substrate being processed.

El
cut

